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AUG 09 2002

SEQUENCE LISTING

TECH CENTER 1600/2900

<110> PhageTech, Inc.

<120> Compositions and methods involving an essential Staphylococcus Aureus gene and its encoded protein

<130> 21715/1010

<140> US 09/689,952

<141> 2000-10-12

<150> US 09/470,512

<151> 1999-12-22

<150> US 09/470,804

<151> 1999-09-28

<150> US 60/110,992

<151> 1998-12-03

<160> 19

<170> PatentIn version 3.1

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<212> DNA

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ttaaacaatt tagaaacact gtgtattaaa tgtcacaaca aaaaagaaaa gagatttata 41640
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<210> 4
<211> 159
<212> DNA
<213> Staphylococcus aureus

<400> 4
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gcagaacgtc atacacgccc cgctatcgtc gaatattaa 159

<210> 5
<211> 52
<212> PRT
<213> Staphylococcus aureus

<400> 5

Met Val Thr Lys Glu Phe Leu Lys Thr Lys Leu Glu Cys Ser Asp Met
1 5 10 15

Tyr Ala Gln Lys Leu Ile Asp Glu Ala Gln Gly Asp Glu Asn Arg Leu
20 25 30

Tyr Asp Leu Phe Ile Gln Lys Leu Ala Glu Arg His Thr Arg Pro Ala
35 40 45

Ile Val Glu Tyr
50

<210> 6
<211> 1362
<212> DNA
<213> Bacillus subtilis

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atgacagacc ttctgaatga ccggttcct ccgcaaaata tagaagccga acaagccgtg 60
ttaggcgcta tttttttaca gccgtctgct ttaacactgg cttcagaagt attgattcca 120

| | |
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| gatgatttct atagaatgtc ccaccaaaaa atctataatg cgatgctggg gtcgggtgac | 180 |
| cgagggtgaac cggttgatct ggtgacagtt acatcagagc ttgcgaacac agacctgctg | 240 |
| gaagaagtag gcggtatttc atatttgaca gatatcgcaa actcgggtgcc gacagcggct | 300 |
| aacatagaat attacgcgaa aatcgttgag gaaaaatcga ttcttcgccg attaatacaga | 360 |
| actgcgacaa cgattgctca agacgggtat acccgtgagg atgaggtcga ggatttactc | 420 |
| agtgaagcgg aaaaaacgat tatggaagtg gcacagcgca aaaacacgag tgccttccaa | 480 |
| aatattaagg acgtccttgt ccagacctat gataatatcg aacagcttta caatcgaaaa | 540 |
| ggtgatatac cggaattcc aacagggttt acggagcttg accggatgac tgcgggtttc | 600 |
| cagcgcaacg acttgatcat tgtggctgcc cgtccttcag tagggaaaac agcctttgcc | 660 |
| ctgaacatcg cacaaaacgt ggcgacgaag accgatgaga gcgtagcgat tttcagttct | 720 |
| gagatgggtg ccgagcagct cgttatgcgt atgctctgtg ccgagggaaa tatcaatgcc | 780 |
| cagaatctcc gtacaggtaa cctgaccgaa gaggattggg gcaagctgac gatggcaatg | 840 |
| ggaagcctat cgaacagcgg gatttacatc gatgatacac cgggtattcg agtgagtga | 900 |
| atccgtgcc aagtgcgccg ctigaagcag gaaagcgggc tgggcatgat tttgatcgat | 960 |
| tacctgcaat tgattcaggg aagcggctgt tcaaaggaca accgtcagca ggaagtatct | 1020 |
| gaaatttccc gtgaactgaa gtcgattgcg agggagctgc aagtccctgt tatcgcgctt | 1080 |
| tctcagcttt ccaggggtgt tgagcagcgt caggataaac gtccgatgat gtctgatatc | 1140 |
| cgggaatcag gaagtatcga gcaggacgcg gatattgtcg cgttccttta tcgtgatgac | 1200 |
| tactatgaca aagaaaccga gaataaaaat attatcgaaa ttattatcgc caaacagcgt | 1260 |
| aacggcccg taggaaccgt gtctcttgcg ttcgtaaaag aatacaaaa attcgtcaac | 1320 |
| ctggaacggc gttttgatga cgcaggcgtt ccgccggcg ca | 1362 |

<210> 7
 <211> 1401
 <212> DNA
 <213> Staphylococcus aureus

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| ttagggttcaa ttattataga tccagaattg attaatacta ctcaggaagt tttgcttcct | 120 |
| gagtcgtttt ataggggtgc ccatcaacat attttcctgt caatgatgca cttaaatgaa | 180 |
| gataataaag aaattgatgt tgtaacattg atggatcaat tatcgacgga aggtacgttg | 240 |

aatgaagcgg gtggcccgca atatcttgca gagttatcta caaatgtacc aacgacgcga 300
aatgttcagt attatactga tatcgtttct aagcatgcat taaaacgtag attgattcaa 360
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gacattcgag acgtcttagg acaagtgtat gaaacagctg aagagcttga tcaaaatagt 540
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aaccgaaatg atttaattat ccttgacgcg cgtccatctg taggtaagac tgcgttcgca 660
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gcacatgcag atatgatgta a 1401

<210> 8
<211> 454
<212> PRT
<213> Bacillus subtilis

<400> 8

Met Thr Asp Leu Leu Asn Asp Arg Leu Pro Pro Gln Asn Ile Glu Ala
1 5 10 15

Glu Gln Ala Val Leu Gly Ala Ile Phe Leu Gln Pro Ser Ala Leu Thr
20 25 30

Leu Ala Ser Glu Val Leu Ile Pro Asp Asp Phe Tyr Arg Met Ser His

| 35 | | | | | 40 | | | | | 45 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Lys | Ile | Tyr | Asn | Ala | Met | Leu | Val | Leu | Gly | Asp | Arg | Gly | Glu | Pro |
| 50 | | | | | 55 | | | | | 60 | | | | | |
| Val | Asp | Leu | Val | Thr | Val | Thr | Ser | Glu | Leu | Ala | Asn | Thr | Asp | Leu | Leu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Glu | Glu | Val | Gly | Gly | Ile | Ser | Tyr | Leu | Thr | Asp | Ile | Ala | Asn | Ser | Val |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Pro | Thr | Ala | Ala | Asn | Ile | Glu | Tyr | Tyr | Ala | Lys | Ile | Val | Glu | Glu | Lys |
| | | | 100 | | | | | | 105 | | | | | 110 | |
| Ser | Ile | Leu | Arg | Arg | Leu | Ile | Arg | Thr | Ala | Thr | Thr | Ile | Ala | Gln | Asp |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Gly | Tyr | Thr | Arg | Glu | Asp | Glu | Val | Glu | Asp | Leu | Leu | Ser | Glu | Ala | Glu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Lys | Thr | Ile | Met | Glu | Val | Ala | Gln | Arg | Lys | Asn | Thr | Ser | Ala | Phe | Gln |
| 145 | | | | | | 150 | | | | | 155 | | | | 160 |
| Asn | Ile | Lys | Asp | Val | Leu | Val | Gln | Thr | Tyr | Asp | Asn | Ile | Glu | Gln | Leu |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Tyr | Asn | Arg | Lys | Gly | Asp | Ile | Thr | Gly | Ile | Pro | Thr | Gly | Phe | Thr | Glu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Leu | Asp | Arg | Met | Thr | Ala | Gly | Phe | Gln | Arg | Asn | Asp | Leu | Ile | Ile | Val |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ala | Ala | Arg | Pro | Ser | Val | Gly | Lys | Thr | Ala | Phe | Ala | Leu | Asn | Ile | Ala |
| | | 210 | | | | | 215 | | | | | 220 | | | |
| Gln | Asn | Val | Ala | Thr | Lys | Thr | Asp | Glu | Ser | Val | Ala | Ile | Phe | Ser | Leu |
| 225 | | | | | | 230 | | | | | 235 | | | | 240 |
| Glu | Met | Gly | Ala | Glu | Gln | Leu | Val | Met | Arg | Met | Leu | Cys | Ala | Glu | Gly |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Asn | Ile | Asn | Ala | Gln | Asn | Leu | Arg | Thr | Gly | Asn | Leu | Thr | Glu | Glu | Asp |
| | | | 260 | | | | | 265 | | | | | 270 | | |

Trp Gly Lys Leu Thr Met Ala Met Gly Ser Leu Ser Asn Ser Gly Ile
275 280 285

Tyr Ile Asp Asp Thr Pro Gly Ile Arg Val Ser Glu Ile Arg Ala Lys
290 295 300

Cys Arg Arg Leu Lys Gln Glu Ser Gly Leu Gly Met Ile Leu Ile Asp
305 310 315 320

Tyr Leu Gln Leu Ile Gln Gly Ser Gly Arg Ser Lys Asp Asn Arg Gln
325 330 335

Gln Glu Val Ser Glu Ile Ser Arg Glu Leu Lys Ser Ile Ala Arg Glu
340 345 350

Leu Gln Val Pro Val Ile Ala Leu Ser Gln Leu Ser Arg Gly Val Glu
355 360 365

Gln Arg Gln Asp Lys Arg Pro Met Met Ser Asp Ile Arg Glu Ser Gly
370 375 380

Ser Ile Glu Gln Asp Ala Asp Ile Val Ala Phe Leu Tyr Arg Asp Asp
385 390 395 400

Tyr Tyr Asp Lys Glu Thr Glu Asn Lys Asn Ile Ile Glu Ile Ile Ile
405 410 415

Ala Lys Gln Arg Asn Gly Pro Val Gly Thr Val Ser Leu Ala Phe Val
420 425 430

Lys Glu Tyr Asn Lys Phe Val Asn Leu Glu Arg Arg Phe Asp Asp Ala
435 440 445

Gly Val Pro Pro Gly Ala
450

<210> 9

<211> 466

<212> PRT

<213> Staphylococcus aureus

<400> 9

Met Asp Arg Met Tyr Glu Gln Asn Gln Met Pro His Asn Asn Glu Ala
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 Glu Gln Ser Val Leu Gly Ser Ile Ile Ile Asp Pro Glu Leu Ile Asn
 20 25 30
 Thr Thr Gln Glu Val Leu Leu Pro Glu Ser Phe Tyr Arg Gly Ala His
 35 40 45
 Gln His Ile Phe Arg Ala Met Met His Leu Asn Glu Asp Asn Lys Glu
 50 55 60
 Ile Asp Val Val Thr Leu Met Asp Gln Leu Ser Thr Glu Gly Thr Leu
 65 70 75 80
 Asn Glu Ala Gly Gly Pro Gln Tyr Leu Ala Glu Leu Ser Thr Asn Val
 85 90 95
 Pro Thr Thr Arg Asn Val Gln Tyr Tyr Thr Asp Ile Val Ser Lys His
 100 105 110
 Ala Leu Lys Arg Arg Leu Ile Gln Thr Ala Asp Ser Ile Ala Asn Asp
 115 120 125
 Gly Tyr Asn Asp Glu Leu Glu Leu Asp Ala Ile Leu Ser Asp Ala Glu
 130 135 140
 Arg Arg Ile Leu Glu Leu Ser Ser Ser Arg Glu Ser Asp Gly Phe Lys
 145 150 155 160
 Asp Ile Arg Asp Val Leu Gly Gln Val Tyr Glu Thr Ala Glu Glu Leu
 165 170 175
 Asp Gln Asn Ser Gly Gln Thr Pro Gly Ile Pro Thr Gly Tyr Arg Asp
 180 185 190
 Leu Asp Gln Met Thr Ala Gly Phe Asn Arg Asn Asp Leu Ile Ile Leu
 195 200 205
 Ala Ala Arg Pro Ser Val Gly Lys Thr Ala Phe Ala Leu Asn Ile Ala
 210 215 220
 Gln Lys Val Ala Thr His Glu Asp Met Tyr Thr Val Gly Ile Phe Ser

| | | | | | | |
|-----------------------------------------------------------------|-----|-----|--|-----|--|-----|
| 225 | | 230 | | 235 | | 240 |
| Leu Glu Met Gly Ala Asp Gln Leu Ala Thr Arg Met Ile Cys Ser Ser | | | | | | |
| | 245 | | | 250 | | 255 |
| Gly Asn Val Asp Ser Asn Arg Leu Arg Thr Gly Thr Met Thr Glu Glu | | | | | | |
| | 260 | | | 265 | | 270 |
| Asp Trp Ser Arg Phe Thr Ile Ala Val Gly Lys Leu Ser Arg Thr Lys | | | | | | |
| | 275 | | | 280 | | 285 |
| Ile Phe Ile Asp Asp Thr Pro Gly Ile Arg Ile Asn Asp Leu Arg Ser | | | | | | |
| | 290 | | | 295 | | 300 |
| Lys Cys Arg Arg Leu Lys Gln Glu His Gly Leu Asp Met Ile Val Ile | | | | | | |
| 305 | | 310 | | 315 | | 320 |
| Asp Tyr Leu Gln Leu Ile Gln Gly Ser Gly Ser Arg Ala Ser Asp Asn | | | | | | |
| | 325 | | | 330 | | 335 |
| Arg Gln Gln Glu Val Ser Glu Ile Ser Arg Thr Leu Lys Ala Leu Ala | | | | | | |
| | 340 | | | 345 | | 350 |
| Arg Glu Leu Glu Cys Pro Val Ile Ala Leu Ser Gln Leu Ser Arg Gly | | | | | | |
| | 355 | | | 360 | | 365 |
| Val Glu Gln Arg Gln Asp Lys Arg Pro Met Met Ser Asp Ile Arg Glu | | | | | | |
| | 370 | | | 375 | | 380 |
| Ser Gly Ser Ile Glu Gln Asp Ala Asp Ile Val Ala Phe Leu Tyr Arg | | | | | | |
| 385 | | 390 | | 395 | | 400 |
| Asp Asp Tyr Tyr Asn Arg Gly Gly Asp Glu Asp Asp Asp Asp Asp Gly | | | | | | |
| | 405 | | | 410 | | 415 |
| Gly Phe Glu Pro Gln Thr Asn Asp Glu Asn Gly Glu Ile Glu Ile Ile | | | | | | |
| | 420 | | | 425 | | 430 |
| Ile Ala Lys Gln Arg Asn Gly Pro Thr Gly Thr Val Lys Leu His Phe | | | | | | |
| | 435 | | | 440 | | 445 |
| Met Lys Gln Tyr Asn Lys Phe Thr Asp Ile Asp Tyr Ala His Ala Asp | | | | | | |
| | 450 | | | 455 | | 460 |

Met Met
465

<210> 10
<211> 313
<212> PRT
<213> Staphylococcus aureus

<400> 10

Met Gly Gly Gly Gln Ser Ile Met Lys Gln Phe Lys Ser Ile Ile Asn
1 5 10 15

Thr Ser Gln Asp Phe Glu Lys Arg Ile Glu Lys Ile Lys Lys Glu Val
20 25 30

Ile Asn Asp Pro Asp Val Lys Gln Phe Leu Glu Ala His Arg Ala Glu
35 40 45

Leu Thr Asn Ala Met Ile Asp Glu Asp Leu Asn Val Leu Gln Glu Tyr
50 55 60

Lys Asp Gln Gln Lys His Tyr Asp Gly His Lys Phe Ala Asp Cys Pro
65 70 75 80

Asn Phe Val Lys Gly His Val Pro Glu Leu Tyr Val Asp Asn Asn Arg
85 90 95

Leu Lys Ile Arg Tyr Leu Gln Cys Pro Cys Lys Ile Lys Tyr Asp Glu
100 105 110

Glu Arg Phe Glu Ala Glu Leu Ile Thr Ser His Asn Met Gln Arg Asp
115 120 125

Thr Leu Asn Ala Lys Leu Lys Asp Leu Tyr Met Asn His Arg Asp Arg
130 135 140

Leu Asp Val Ala Met Ala Ala Asp Asp Ile Cys Thr Ala Ile Thr Asn
145 150 155 160

Gly Glu Gln Val Lys Gly Leu Tyr Leu Tyr Gly Pro Phe Gly Thr Gly
165 170 175

Lys Ser Phe Leu Leu Gly Ala Ile Ala Asn Gln Leu Lys Ser Lys Lys
 180 185 190

Val Arg Ser Thr Ile Ile Tyr Leu Pro Glu Phe Ile Arg Thr Leu Lys
 195 200 205

Gly Gly Phe Lys Asp Gly Ser Phe Glu Lys Lys Leu His Arg Val Arg
 210 215 220

Glu Ala Asn Ile Leu Met Leu Asp Asp Ile Gly Ala Glu Glu Val Thr
 225 230 235 240

Pro Trp Val Arg Asp Glu Val Ile Gly Pro Leu Leu His Tyr Arg Met
 245 250 255

Val His Glu Leu Pro Thr Phe Phe Ser Ser Asn Phe Asp Tyr Ser Glu
 260 265 270

Leu Glu His His Leu Ala Met Thr Arg Asp Gly Glu Glu Lys Thr Lys
 275 280 285

Ala Ala Arg Ile Ile Glu Arg Val Lys Ser Leu Ser Thr Pro Tyr Phe
 290 295 300

Leu Ser Gly Glu Asn Phe Arg Asn Asn
 305 310

<210> 11
 <211> 12
 <212> PRT
 <213> Staphylococcus aureus

<220>
 <221> misc_feature
 <223> predicted tryptic peptide

<400> 11

Gly His Val Pro Glu Leu Tyr Val Asp Asn Asn Arg
 1 5 10

<210> 12
 <211> 11
 <212> PRT
 <213> Staphylococcus aureus

<220>
<221> misc_feature
<223> predicted tryptic peptide

<400> 12

Ser Thr Ile Ile Tyr Leu Pro Glu Phe Ile Arg
1 5 10

<210> 13
<211> 14
<212> PRT
<213> Staphylococcus aureus

<220>
<221> misc_feature
<223> predicted tryptic peptide

<400> 13

Ser Leu Ser Thr Pro Tyr Phe Leu Ser Gly Glu Asn Phe Arg
1 5 10

<210> 14
<211> 280
<212> PRT
<213> Bacillus subtilis

<400> 14

Asp Gln Asp Val Gln Ala Phe Leu Lys Glu Asn Glu Glu Val Ile Asp
1 5 10 15

Gln Lys Met Ile Glu Lys Ser Leu Asn Lys Leu Tyr Glu Tyr Ile Glu
20 25 30

Gln Ser Lys Asn Cys Ser Tyr Cys Ser Glu Asp Glu Asn Cys Asn Asn
35 40 45

Leu Leu Glu Gly Tyr His Pro Lys Leu Val Val Asn Gly Arg Ser Ile
50 55 60

Asp Ile Glu Tyr Tyr Glu Cys Pro Val Lys Arg Lys Leu Asp Gln Gln
65 70 75 80

Lys Lys Gln Gln Ser Leu Met Lys Ser Met Tyr Ile Gln Gln Asp Leu
85 90 95

Leu Gly Ala Thr Phe Gln Gln Val Asp Ile Ser Asp Pro Ser Arg Leu
100 105 110

Ala Met Phe Gln His Val Thr Asp Phe Leu Lys Ser Tyr Asn Glu Thr
115 120 125

Gly Lys Gly Lys Gly Leu Tyr Leu Tyr Gly Lys Phe Gly Val Gly Lys
130 135 140

Thr Phe Met Leu Ala Ala Ile Ala Asn Glu Leu Ala Glu Lys Glu Tyr
145 150 155 160

Ser Ser Met Ile Val Tyr Val Pro Glu Phe Val Arg Glu Leu Lys Asn
165 170 175

Ser Leu Gln Asp Gln Thr Leu Glu Glu Lys Leu Asn Met Val Lys Thr
180 185 190

Thr Pro Val Leu Met Leu Asp Asp Ile Gly Ala Glu Ser Met Thr Ser
195 200 205

Trp Val Arg Asp Glu Val Ile Gly Thr Val Leu Gln His Arg Met Ser
210 215 220

Gln Gln Leu Pro Thr Phe Phe Ser Ser Asn Phe Ser Pro Asp Glu Leu
225 230 235 240

Lys His His Phe Thr Tyr Ser Gln Arg Gly Glu Lys Glu Glu Val Lys
245 250 255

Ala Ala Arg Leu Met Glu Arg Ile Leu Tyr Leu Ala Ala Pro Ile Arg
260 265 270

Leu Asp Gly Glu Asn Arg Arg His
275 280

<210> 15

<211> 278

<212> PRT

<213> Bacillus halodurans

<400> 15

Pro His Val Gln Leu Phe Leu Glu Glu His Pro Ser Leu Ser Pro Ile

| | | | |
|-----|-----|-----|-----|
| 1 | 5 | 10 | 15 |
| Thr | Leu | Glu | Gln |
| 20 | | 25 | 30 |
| Leu | Ser | Lys | Leu |
| | | | Tyr |
| | | | Glu |
| | | | Tyr |
| | | | Gln |
| | | | Lys |
| | | | Glu |
| | | | Gln |
| Ser | His | Cys | Ala |
| 35 | | | |
| His | Cys | Pro | Gly |
| | | | Leu |
| | | | Gln |
| | | | Lys |
| | | | Cys |
| | | | Pro |
| | | | Asn |
| | | | Leu |
| | | | Met |
| Lys | Gly | Tyr | Gln |
| 50 | | | |
| Pro | Thr | Leu | Tyr |
| | | | Val |
| | | | Glu |
| | | | Arg |
| | | | Asp |
| | | | Ser |
| | | | Leu |
| | | | Glu |
| | | | Leu |
| Ser | Tyr | Ser | Pro |
| 65 | | | |
| Cys | Pro | Leu | Lys |
| | | | Glu |
| | | | Glu |
| | | | Glu |
| | | | Glu |
| | | | Arg |
| | | | Glu |
| | | | Lys |
| | | | Lys |
| Lys | Arg | Ser | Leu |
| | | | |
| | | | Ile |
| | | | Arg |
| | | | Ser |
| | | | Leu |
| | | | Tyr |
| | | | Ile |
| | | | Pro |
| | | | Lys |
| | | | Glu |
| | | | Ile |
| | | | Leu |
| | | | Glu |
| Ala | Lys | Phe | Asp |
| | | | |
| | | | Asp |
| | | | Val |
| | | | Glu |
| | | | Ser |
| | | | Glu |
| | | | Pro |
| | | | Gly |
| | | | Arg |
| | | | Ser |
| | | | Ile |
| | | | Ala |
| | | | Ser |
| His | Arg | Ala | Leu |
| | | | |
| | | | Glu |
| | | | Phe |
| | | | Ala |
| | | | Leu |
| | | | Ser |
| | | | Ala |
| | | | Lys |
| | | | Pro |
| | | | Gly |
| | | | Glu |
| | | | Asp |
| | | | Gly |
| Met | Gly | Leu | Tyr |
| | | | |
| | | | Leu |
| | | | Tyr |
| | | | Gly |
| | | | Lys |
| | | | Phe |
| | | | Gly |
| | | | Val |
| | | | Gly |
| | | | Lys |
| | | | Thr |
| | | | Phe |
| | | | Leu |
| Met | Gly | Ala | Ile |
| | | | |
| | | | Ala |
| | | | Asn |
| | | | Glu |
| | | | Leu |
| | | | Lys |
| | | | Asp |
| | | | Arg |
| | | | Gly |
| | | | Ile |
| | | | Asp |
| | | | Ser |
| | | | Thr |
| Ile | Val | Tyr | Val |
| | | | |
| | | | Pro |
| | | | Asp |
| | | | Phe |
| | | | Phe |
| | | | Arg |
| | | | Glu |
| | | | Leu |
| | | | Lys |
| | | | Gln |
| | | | Ser |
| | | | Ile |
| | | | Gly |
| Asp | Gly | Thr | Phe |
| | | | |
| | | | Gln |
| | | | Gln |
| | | | Lys |
| | | | Leu |
| | | | Asp |
| | | | Phe |
| | | | Val |
| | | | Lys |
| | | | Asn |
| | | | Ala |
| | | | Gln |
| | | | Val |
| Leu | Ile | Phe | Asp |
| | | | |
| | | | Asp |
| | | | Ile |
| | | | Gly |
| | | | Ala |
| | | | Glu |
| | | | Thr |
| | | | Met |
| | | | Thr |
| | | | Ser |
| | | | Trp |
| | | | Val |
| | | | Arg |
| Asp | Asp | Val | Leu |
| | | | |
| | | | Gly |
| | | | Val |
| | | | Ile |
| | | | Leu |
| | | | Gln |
| | | | Tyr |
| | | | Arg |
| | | | Ile |
| | | | Met |
| | | | Glu |
| | | | Lys |
| | | | Leu |
| Pro | Thr | Leu | Phe |
| | | | |
| | | | Thr |
| | | | Ser |
| | | | Asn |
| | | | Tyr |
| | | | Asp |
| | | | Tyr |
| | | | Asp |
| | | | Glu |
| | | | Leu |
| | | | Glu |
| | | | Glu |
| | | | His |

Leu Ala Tyr Asn Asp Lys Ser Gly Thr Glu Leu Leu Lys Ala Lys Arg
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Val Met Glu Arg Ile Arg His Tyr Thr Val Ser Val Met Val Gln Gly
 260 265 270

Gln Asn Arg Arg Glu His
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 <213> Staphylococcus aureus

<400> 16

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Gly Leu Tyr Leu Tyr Gly Pro Phe Gly Thr Gly Lys Ser Phe Ile Leu
 20 25 30

Gly Ala Ile Ala Asn Gln Leu Lys Ser Lys Lys Val Arg Ser Thr Ile
 35 40 45

Ile Tyr Leu Pro Glu Phe Ile Arg Thr Leu Lys Gly Gly Phe Lys Asp
 50 55 60

Gly Ser Phe Glu Lys Lys Leu His Arg Val Arg Glu Ala Asn Ile Leu
 65 70 75 80

Met Leu Asp Asp Ile Gly Ala Glu Glu Val Thr Pro Trp Val Arg Asp
 85 90 95

Glu Val Ile Gly Pro Leu Leu His Tyr Arg Met Val His Glu Leu Pro
 100 105 110

Thr Phe Phe Ser Ser Asn Phe Asp Tyr Ser Glu Leu Glu His His Leu
 115 120 125

Ala Met Thr Arg Asp Gly Glu Glu Lys Thr Lys Ala Ala Arg Ile Ile
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Glu Arg Val Lys Ser Leu Ser Thr Pro Tyr Phe Leu Ser Gly Glu Asn
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Phe Arg Asn Asn

<210> 17
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<400> 17
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 ggcttttaaag atggttcttt tgaaaagaaa ttacatcgcg taagagaagc aaacatttta 240
 atgcttgatg atattggggc tgaagaagtg actccatggg tgagagatga ggtaattgga 300
 cctttgctac attatcgaat ggttcatgaa ttaccaacat tctttagttc taattttgac 360
 tatagtgaat tggaacatca tttagcgatg actcgtgatg gtgaagagaa gactaaagca 420
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 <211> 250
 <212> PRT
 <213> Staphylococcus aureus

<400> 18

Tyr Lys Asp Gln Gln Lys His Tyr Asp Gly His Lys Phe Ala Asp Cys
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Pro Asn Phe Val Lys Gly His Val Pro Glu Leu Tyr Val Asp Asn Asn
 20 25 30

Arg Ile Lys Ile Arg Tyr Leu Gln Cys Pro Cys Lys Ile Lys Tyr Asp
 35 40 45

Glu Glu Arg Phe Glu Ala Glu Leu Ile Thr Ser His His Met Gln Arg
 50 55 60

Asp Thr Leu Asn Ala Lys Leu Lys Asp Ile Tyr Met Asn His Arg Asp

| | | | |
|-----------------------------------------------------------------|-----|-----|-----|
| 65 | 70 | 75 | 80 |
| Arg Leu Asp Val Ala Met Ala Ala Asp Asp Ile Cys Thr Ala Ile Thr | 85 | 90 | 95 |
| Asn Gly Glu Gln Val Lys Gly Leu Tyr Leu Tyr Gly Pro Phe Gly Thr | 100 | 105 | 110 |
| Gly Lys Ser Phe Ile Leu Gly Ala Ile Ala Asn Gln Leu Lys Ser Lys | 115 | 120 | 125 |
| Lys Val Arg Ser Thr Ile Ile Tyr Leu Pro Glu Phe Ile Arg Thr Leu | 130 | 135 | 140 |
| Lys Gly Gly Phe Lys Asp Gly Ser Phe Glu Lys Lys Leu His Arg Val | 145 | 150 | 155 |
| Arg Glu Ala Asn Ile Leu Met Leu Asp Asp Ile Gly Ala Glu Glu Val | 165 | 170 | 175 |
| Thr Pro Trp Val Arg Asp Glu Val Ile Gly Pro Leu Leu His Tyr Arg | 180 | 185 | 190 |
| Met Val His Glu Leu Pro Thr Phe Phe Ser Ser Asn Phe Asp Tyr Ser | 195 | 200 | 205 |
| Glu Leu Glu His His Leu Ala Met Thr Arg Asp Gly Glu Glu Lys Thr | 210 | 215 | 220 |
| Lys Ala Ala Arg Ile Ile Glu Arg Val Lys Ser Leu Ser Thr Pro Tyr | 225 | 230 | 235 |
| Phe Leu Ser Gly Glu Asn Phe Arg Asn Asn | 245 | 250 | |

<210> 19
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 <213> Staphylococcus aureus

<400> 19

| | | | |
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| Gly His Val Pro Glu Asn Val Thr Asp Asn Asp Arg | 1 | 5 | 10 |
|-------------------------------------------------|---|---|----|

